



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,128	07/11/2003	Itaru Kanno	402696	2934
23548	7590	06/02/2006		
LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960			EXAMINER WEBB, GREGORY E	
			ART UNIT 1751	PAPER NUMBER

DATE MAILED: 06/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/617,128

Applicant(s)

KANNO ET AL.

Examiner

Gregory E. Webb

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,6 and 8-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6 and 8-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/29/06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

5/29/06

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments concerning the priority document have been considered and found acceptable. The office acknowledges the document filed July 11, 2003.

The applicant has amended claim 1 to now include the limitation of the weight percentage of the hydrofluoric acid and the base without a metal.

The applicant argues that the prior art fails to teach the limitations now presented by amended claim 1.

Concerning the Tanabe references ('848, '274, '063, and '000) the applicant argues that the prior art fails to teach component C specifically for the intended use of serving as a pH adjuster. Here the examiner disagrees strongly with such arguments. First Tanabe is concerned with the pH of their compositions. For example Tanabe '848 teaches the following:

In order to prepare the hydrofluorate remover solution so that it is almost neutral with a pH of 5 to 8, ingredient (a) should be prepared so that it is almost neutral. Although a uniform specification cannot be uniformly made, since the amount of the metallic-ion-free base added to the hydrofluoric acid solution for neutralization varies depending on the type of base, for example, in the case of an aqueous ammonia, an ingredient (a) having a desirable pH value can be prepared by mixing a hydrofluoric acid solution and aqueous ammonia having equal volumes and equal molar concentrations. Meanwhile, in the case of monoethanolamine, an ingredient (a) can be obtained by mixing 1,000 ml of a hydrofluoric acid solution having a concentration of 1 mole/liter with 1 mole of monoethanolamine. By adjusting **the pH** of ingredient (a) to a value within the above-described range, the ability of the remover solution to remove degenerated films is not lessened, metallic films on the substrate and peripheral apparatuses such as a chemical solution-feeding apparatus can be prevented from corroding, and the remover solution can be handled safely. Further, since the hydrogen fluoride content is reduced, a complicated exhaust-gas treatment and waste-solution disposal to prevent hydrogen fluoride from being generated are unnecessary. (*emphasis added*)

Art Unit: 1751

Second Tanabe does teach pH adjusting agents such as the instantly claimed organic acids in the following:

Examples of carboxyl-group-containing organic compounds and anhydrides thereof include **formic acid, acetic acid, propionic acid, butyric acid, isobutyric acid, oxalic acid, malonic acid, succinic acid, glutaric acid, maleic acid, fumaric acid, benzoic acid, phthalic acid, 1,2,3-benzenetricarboxylic acid, glycolic acid, lactic acid, malic acid, citric acid**, acetic anhydride, phthalic anhydride, maleic anhydride, succinic anhydride, and salicylic acid. Formic acid, **phthalic acid, benzoic acid**, phthalic anhydride, and salicylic acid are the preferred carboxyl-group-containing organic compounds. Phthalic anhydride and salicylic acid are especially preferred. (*emphasis added*)

And finally, the mere addition of a component for a different functional purpose in a compositional claim does not overcome a prior art rejection. In *In re Linter* the claimed invention was a laundry composition consisting essentially of a dispersant, cationic fabric softener, sugar, sequestering phosphate, and brightener in specified proportions. The claims were rejected over the combination of a primary reference which taught all the claim limitations except for the presence of sugar, and secondary references which taught the addition of sugar as a filler or weighting agent in compositions containing cationic fabric softeners. Appellant argued that in the claimed invention, the sugar is responsible for the compatibility of the cationic softener with the other detergent components. The court sustained the rejection, stating “The fact that appellant uses sugar for a different purpose does not alter the conclusion that its use in a prior art composition would be [sic, would have been] *prima facie* obvious from the purpose disclosed in the references.” 173 USPQ at 562.

Art Unit: 1751

Concerning claims 6 and 8, the applicant argues that the prior art fails to teach the phosphonic acid (C1 component). With respect to the Tanabe references, the examiner agrees that these references fail to teach the phosphonic component. As such the examiner withdraws rejections to claims 6 and 8 and their dependent claims over all previous Tanabe rejections. However, the Ikemoto reference still reads on the sulfur containing component, the polyhydric alcohol and the newly added phosphonic acid component as can be seen in the following recitation from

Ikemoto:

Concerning the salt of hydrofluoric acid, preferred hydrofluoric salt and the claimed hydroxylamine, Ikemoto teaches the following:

The fluorine compounds usable in the present invention are hydrofluoric acid, **ammonium fluorides** and amine hydrofluorides including ammonium fluoride, acid **ammonium fluoride**, methylamine hydrofluoride, ethylamine hydrofluoride, propylamine hydrofluoride, tetramethyl**ammonium fluoride**, tetraethyl**ammonium fluoride**, ethanolamine hydrofluoride, methylethanolamine hydrofluoride, dimethylethanolamine hydrofluoride, **hydroxylamine** hydrofluoride, dimethyl**hydroxylamine** hydrofluoride, triethylenediamine hydrofluoride, etc. Of these fluorine compounds, **ammonium fluoride** and tetramethyl**ammonium fluoride** are preferred, and **ammonium fluoride** is more preferred. These fluorine compounds may be used alone or in combination of two or more. (*emphasis added*)

Concerning the base not containing a metal, organic amine compound and the ammonium salt, Ikemoto teaches the following:

The resist stripping composition according to the present invention may contain a corrosion inhibitor, which may include sugars such as fructose, glucose, galactose and sorbose; sugar alcohols such as sorbitol, xylitol and erythritol; polyphenols such as gallotannin, ellagitannin, catechin and proanthocyan; and quaternary **ammonium salts** such as tetramethyl**ammonium hydroxide**, tetramethylammonium carbonate and tetramethyl**ammonium formate**. (*emphasis added*)

Concerning the claimed inhibitor, resist, primary fatty amine, tertiary fatty amine, heterocyclic amine, claimed aliphatic acids, aromatic acid, claimed inorganic acids, diethylene triamine penta (methylene phosphonic acid), aliphatic carboxylic acids, aromatic carboxylic acids, amino carboxylic acids and the phosphonic acid, Ikemoto teaches the following:

The **resist** stripping composition according to the present invention may further contain a corrosion inhibitor, which may include aromatic hydroxy compounds

Art Unit: 1751

such as catechol, phenols and pyrogallol; carboxyl-containing organic compounds such as **formic acid, acetic acid, propionic acid, butyric acid, isobutyric acid, oxalic acid, malonic acid, succinic acid, glutaric acid, maleic acid, fumaric acid, benzoic acid, phthalic acid, 1,2,3-benzenetricarboxylic acid, glycolic acid, lactic acid, malic acid, citric acid**, acetic anhydride, phthalic anhydride, maleic anhydride, succinic anhydride and salicylic acid; organic salts of carboxyl-containing organic compounds derived from the carboxyl-containing organic compounds recited above and basic substances such as ethanolamine, **trimethylamine, diethylamine and pyridine**; and chelate compounds such as **phosphoric acid**-based chelate compounds such as 1,2-propanediaminetetramethylene **phosphonic acid** and hydroxyethane **phosphonic acid, carboxylic acid**-based chelate compounds such as ethylenediaminetetra**acetic acid**, dihydroxyethyl**glycine** and nitrilotri**acetic acid**, amine-based chelate compounds such as **bipyridine**, tetraphenylporphyrin and phenanthroline, and oxime-based chelate compounds such as dimethylglyoxime and diphenylglyoxime. (*emphasis added*)

Concerning the polyhydric alcohol, Ikemoto teaches the following:

6. The resist stripping composition according to claim 5, wherein said at least one glycol ether is selected from the group consisting of ethylene glycol monomethyl ether, **ethylene glycol** monoethyl ether, **ethylene glycol** monobutyl ether, **ethylene glycol** dimethyl ether, **ethylene glycol** diethyl ether, **diethylene glycol** monomethyl ether, **diethylene glycol** monoethyl ether, **diethylene glycol** monopropyl ether, **diethylene glycol** monoisopropyl ether, **diethylene glycol** monobutyl ether, **diethylene glycol** monoisobutyl ether, **diethylene glycol** monobenzyl ether, **diethylene glycol** dimethyl ether, **diethylene glycol** diethyl ether, **triethylene glycol** monomethyl ether, **triethylene glycol** dimethyl ether, **polyethylene glycol** monomethyl ether, **diethylene glycol** methyl ethyl ether, **triethylene glycol**, ethylene glycol monomethyl ether acetate, **ethylene glycol** monoethyl ether acetate, **propylene glycol** monomethyl ether, **propylene glycol** dimethyl ether, **propylene glycol** monobutyl ether, **dipropylene glycol** monomethyl ether, **dipropylene glycol** monopropyl ether, **dipropylene glycol** monoisopropyl ether, **dipropylene glycol** monobutyl ether, **dipropylene glycol** dimethyl ether, **dipropylene glycol** dipropyl ether, **dipropylene glycol** diisopropyl ether, **tripropylene glycol** and **tripropylene glycol** monomethyl ether. (*emphasis added*)

Concerning the sulfoxides, Ikemoto teaches the following:

As the rinsing solutions, there may be used water-soluble organic solvents such as methyl alcohol, ethyl alcohol, isopropanol, dimethylacetamide, dimethyl**sulfoxide** (**DMSO**), glycol ethers and ethanolamine, or a mixed solvent composed of any of the above water-soluble organic solvents and ultrapure water. Also, ultrapure water may be used alone as the rinsing solution. The removal of the resist residues using the resist stripping composition of the present invention is sufficiently

Art Unit: 1751

completed without deposition of the fluorine compound even by the rinsing with the water-soluble organic solvent alone. (*emphasis added*)

Concerning the sulfones, Ikemoto teaches the following:

Conventionally, alkaline stripping solutions have been generally used to remove the resist residues. As the alkaline stripping solutions, proposed are a stripping solution containing an alkanol amine or an ethylene oxide adduct of a polyalkylene polyamine, a **sulfone** compound and a glycol monoalkyl ether (Japanese Patent Applications Laid-Open No. 62-49355); a stripping solution containing dimethylsulfoxide as a main ingredient, a diethyleneglycol monoalkyl ether and a nitrogen-containing organic hydroxy compound (Japanese Patent Applications Laid-Open No. 64-42653); and the like. These alkaline stripping solutions, however, show alkaline nature due to amine liberated from the adduct by the action of water absorbed during the use, or show alkaline nature during washing after the stripping treatment if the washing is made using water instead of using an organic solvent such as alcohol, thereby likely to cause severe corrosion of aluminum, etc. widely used as materials for forming fine wirings. Therefore, the known stripping solutions are unsuitable for use in micro-processing techniques requiring a recent strict dimensional accuracy. (*emphasis added*)

Similarly, Hsu teaches phosphonic acids, polyhydric alcohols such as glycols, and sulfur based solvents such as DMSO. Thus these rejections are maintained.

### ***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Based on the applicant's amendments to the claims, the following are new rejections to the instant claims. Previous rejections are also maintained as described above.

Claims 1-4, 6, and 8-13 are anticipated by Abe, Kojiro (US6514352).

Concerning the salt of hydrofluoric acid, preferred hydrofluoric salt, claimed aliphatic acids, diethylene triamine penta (methylene phosphonic acid), aliphatic carboxylic acids and the phosphonic acid, Abe, Kojiro teaches the following:

9. The cleaning method as described in claim 1, wherein said oxidizing agent is selected from the group consisting of hydrogen peroxide, ozone and hypochlorous acid; said chelating agent is selected from the group consisting of **oxalic acid**, 1,2-propanediaminetetramethylenephosphonic acid, diethylenetriaminepentamethylenephosphonic acid and ethylenediaminetetrakis(methylenephosphonic acid); and said fluorine compound is selected from the group consisting of ammonium fluoride and tetramethylammonium fluoride. (*emphasis added*)

Concerning the base not containing a metal, resist, primary fatty amine and the dry etching, Abe, Kojiro teaches the following:

The fluorine compound used in the present invention includes, for example, organic amine fluorides such as ammonium fluoride, acidic ammonium fluoride, **monoethanolamine fluoride**, **methylamine hydrogenfluoride**, **ethylamine hydrogenfluoride** and propylamine hydrogenfluoride, tetramethylammonium fluoride and tetraethylammonium fluoride. Ammonium fluoride and tetramethylammonium fluoride are preferred. These fluorine compounds have a content of usually 0.001 to 20% by weight, preferably 0.005 to 10% by weight based on the cleaning agent. If the fluorine compound has a content of less than 0.001% by weight, the speed for removing the **resist**, the cured **resist** layer and the **etching** residue is reduced. On the other hand, if it exceeds 20% by weight, corrosion of the wiring material and the insulating layer is accelerated. (*emphasis added*)

Concerning the hydrogen ion concentration, organic amine compound and the semiconductor device, Abe, Kojiro teaches the following:

A pH of this cleaning solution shall not specifically be restricted, and it is usually used in a range of pH 3 to 12. It can be selected according to the etching conditions and the kind of a **semiconductor** substrate. When it is used in an alkaline condition, **ammonia**, amine and quaternary ammonium hydroxides such as tetramethyl**ammonium hydroxide** may be added, and when it is used in an acidic condition, organic acids and inorganic acids may be added. (*emphasis added*)

Concerning the claimed inhibitor, aromatic acid, claimed inorganic acids, ammonium salt, aromatic carboxylic acids and the amino carboxylic acids, Abe, Kojiro teaches the following:

The chelating agent used in the present invention includes, for example, aminopolycarboxylic acids such as ethylenediaminetetraacetic acid (EDTA), hydroxyethylethylenediaminetetraacetic acid (DHEDDA), 1,3-propanediaminetetraacetic acid (1,3-PDTA), diethylenetriaminepentaacetic acid (DTDA), triethylenetetraaminehexaacetic acid (TTNA), nitrilotriacetic acid (NTA) and hydroxyethylimino-diacetic acid (HIMDA) or ammonium salts, metal salts and organic alkali salts thereof; phosphonic acid base chelating agents having at least one phosphonic acid group in a molecule such as methyldiphosphonic acid, aminotrismethylenephosphonic acid, ethyldiene-



Art Unit: 1751

diphosphonic acid, 1-hydroxyethylidene-1,1-diphosphonic acid, 1-hydroxypropylidene-1,1-diphosphonic acid, ethylaminobismethylenephosphonic acid, dodecylaminobismethylenephosphonic acid, nitrilotrismethylenephosphonic acid, ethylenediaminebismethylenephosphonic acid, ethylenediaminetetrakisbismethylenephosphonic acid, hexadiaminetetrakisbismethylenephosphonic acid, diethylenetriaminepentamethylenephosphonic acid and 1,2-propanediaminetetramethylenephosphonic acid or **ammonium salts**, organic amine salts and alkali metal salts thereof and oxides in which the compounds having a nitrogen atom in a molecule among these phosphonic acid base chelating agents are oxidized into N-oxides; and condensed **phosphoric acids** such as **metaphosphoric acid**, **tetrametaphosphoric acid**, **hexametaphosphoric acid** and **tripolyphosphoric acid** or **ammonium salts**, metal salts and organic amine salts thereof, **dicarboxylic acids** such as oxalic acid, malonic acid, succinic acid, dimercapto succinic acid, **glutaric acid**, maleic acid, **phthalic acid**, fumaric acid, polycarboxylic acids such as tricarboxylic acid, propane-1,1,2,3-tetracarboxylic acid, butane-1,2,3,4-tetracarboxylic acid, **pyromellitic acid**, oxycarboxylic acids such as glycolic acid, .beta.-hydroxypropionic acid, citric acid, malic acid, tartaric acid, pyruvic acid, diglycol acid, salicylic acid, gallic acid, polyphenols such as catechol, pyrogallol, **phosphoric acids** such as **pyrophosphoric acid**, **polyphosphoric acid**, heterocyclic compounds such as 8-oxyquinoline, diketones such as .alpha., .alpha.'-dipyridyl acetylacetone. (*emphasis added*)

Concerning the metal film having copper and the claimed amide, Abe, Kojiro teaches the use of dimethylacetamide in table 2.

Concerning the polyhydric alcohol, sulfoxides and the sulfones, Abe, Kojiro teaches the following:

The cleaning agent used in the present invention may contain, if necessary, an organic solvent, and it includes, for example, ether base solvents such as **ethylene glycol** monoethyl ether, **ethylene glycol** monobutyl ether, **diethylene glycol** monomethyl ether, **diethylene glycol** monoethyl ether, **diethylene glycol** monobutyl ether, **propylene glycol** monomethyl ether, **propylene glycol** monoethyl ether, **propylene glycol** monobutyl ether, **dipropylene glycol** monomethyl ether, **dipropylene glycol** monoethyl ether, **dipropylene glycol** monobutyl ether, **diethylene glycol** dimethyl ether and **dipropylene glycol** dimethyl ether; amide base solvents such as formamide, monomethyl-formamide, dimethylformamide, monoethylformamide, diethylformamide, acetamide, monomethylacetamide, N-methylpyrrolidone, N-ethylpyrrolidone, N,N-dimethyl-formamide and N,N-dimethylacetamide; and sulfur compound base solvents such as dimethyl**sulfoxide**, dimethyl**sulfone**, diethyl**sulfone**, bis(2-hydroxysulfone) and tetramethylenesulfone. (*emphasis added*)

***Conclusion***

1. Previous rejections of claims 6, 8-9 over all previous Tanabe references are withdrawn based on the arguments presented by the applicant. The Tanabe references fail to teach the phosphonic acid. The remainder of the rejections are maintained as well as the newly presented rejection above.

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

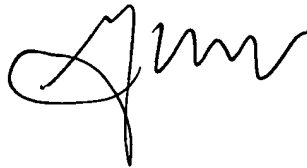
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglass McGinty can be reached on (571)272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1751

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'G Webb', with a stylized, cursive script.

Gregory E. Webb  
Primary Examiner  
Art Unit 1751

gew